

PROCEN^{TEC}



Installation Manual (English) **Adjustable Active DP Terminator T1-Pepper**

Active RS485 segment termination
for non-compliant cable

Designed for use with the COMbricks SALT repeater

All baudrates
Redundant power supply
IP 20 with DIN-rail mounting
Adjustable pull-up and middle resistor

PROCEN^{TEC}
Klopperman 16
2292 JD WATERINGEN
The Netherlands

Tel.: +31-(0)174-671800
Fax: +31-(0)174-671801
Email: info@procentec.com
Web: www.procentec.com

Introduction

The T1-Pepper provides active and reliable adjustable termination for PROFIBUS segments which use non-PROFIBUS cable. By using this component it is possible to use UTP cable, telephone cable or other non-PROFIBUS cable. This can save on installation time and cabling costs when extending or refitting your automation network.

This product has a couple of special features which makes it a very useful infrastructure component; it has two adjustable terminating resistors. The 'Pull up' rotary switch is used to adjust the idle voltage level (normally 1V), which means you can raise the idle voltage for improved EMC defense. The 'Middle' rotary switch is used to change the impedance value for the cable.

It also features a redundant power supply and diagnostic LEDs to indicate the status of each power source.

The T1-Pepper can be installed on a standard DIN-rail.

Installation instructions

Location

The T1-Pepper can be installed everywhere in a non-hazardous area that complies with IP 20 (DIN 40 050) and the specified temperature range of -20 to +60 ° Celsius.

Position

The T1-Pepper can be installed in every position, but it is recommended to install it with the green PROFIBUS connector pointing down. In this position it is easier to read the status display.

Mounting and dismounting

The T1-Pepper has to be mounted on a 35 mm DIN-rail with a minimum width of 60 mm. Fig. 2 and Fig. 1 illustrate how to mount and dismount the T1-Pepper on and from the DIN-rail.

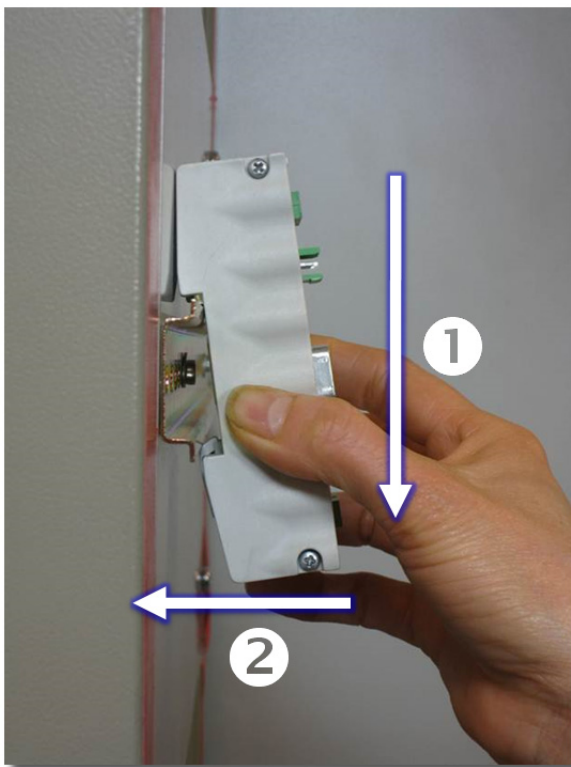


Fig. 2 Mounting; pull-down and push

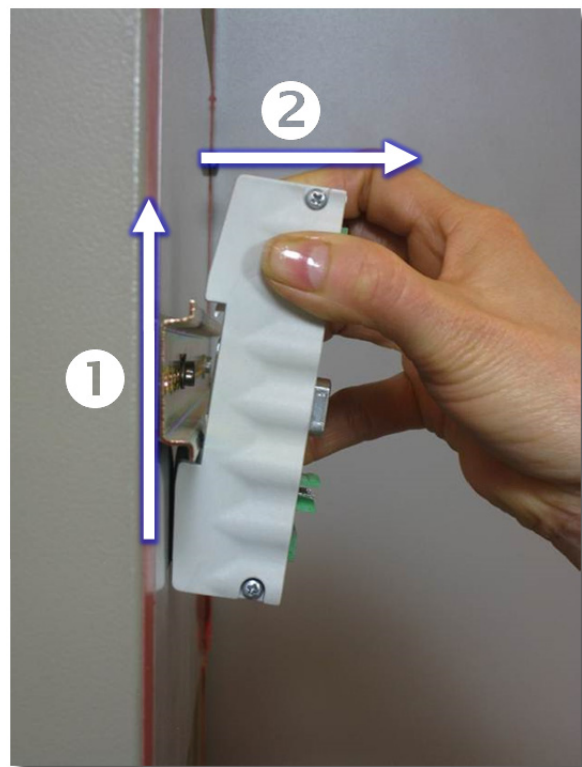


Fig. 1 Dismounting; Push-up and pull

Power supply

Parameters

The power supply has to comply with the following specifications:

Voltage: **19 to 28 VDC**

Current: **Min. 65 mA**

Wiring

The leads of both power connectors have to be wired as follows:

“-“ = 0 V

“+” = Positive Voltage

SH = Earth

Power redundancy

Both power connectors are linked 1-on-1 to the internal power supply of the T1-Pepper. If 1 power supply would fail, the other takes over without delay time. When redundancy is not required, it is sufficient to use 1 power connector. When the T1-Pepper is flipped 180°, the connectors can be used without alteration. Fig. 3 illustrates the location of the power supply connectors.

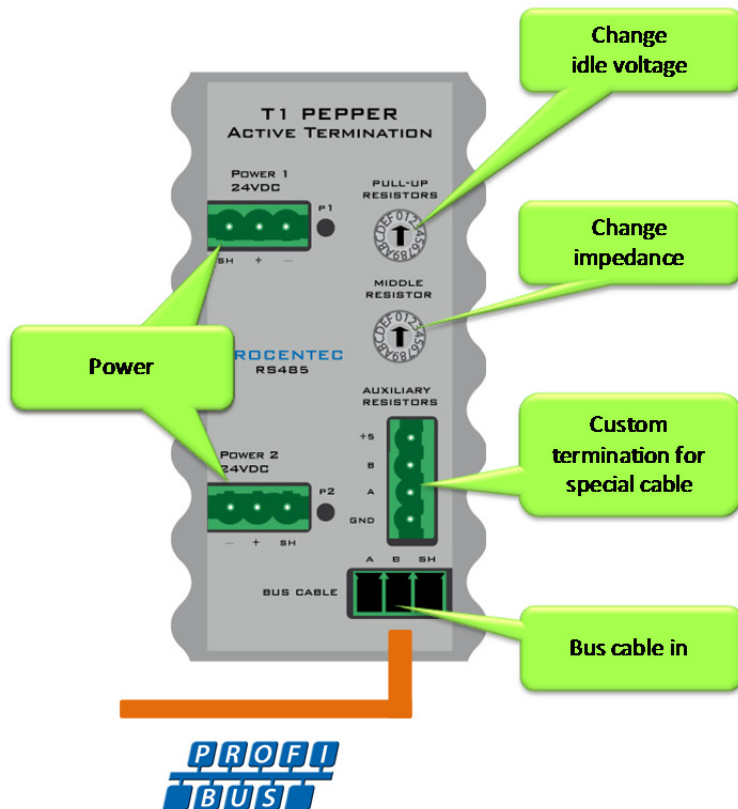


Fig. 3 Structure of the T1-Pepper

PROFIBUS

Middle resistor

Change the 'middle resistor' by rotating this switch. Select the required impedance in the table on page 5, or use our convenient software tool TermCalc.

Pull-up Resistors

Change the 'pull-up resistors' by rotating this switch. Select the required idle voltage in the table on page 6, or use our convenient software tool TermCalc.

Auxiliary resistor connection

In some very special cases, you can attach a custom termination for cable with specifications not covered by this product. If you choose to do this, the rotary switches must both be set to 0.

Screw terminal

The T1-Pepper has one Bus Cable connector, this is where the DP segment ends.

Bus cable pin layout

Pin "A": Green wire

Pin "B": Red wire

Pin "SH": Direct cable shielding

Pin "I": Indirect cable shielding

Ground Clip

It is recommended to use the supplied GC-01 ground clip to attach the cable shield to the screw connector, as shown in figure 4, for easier shield connection and better strain relief.

The Ground Clip GC-01 can be ordered separately per 25pcs with order code **101-00201B**.

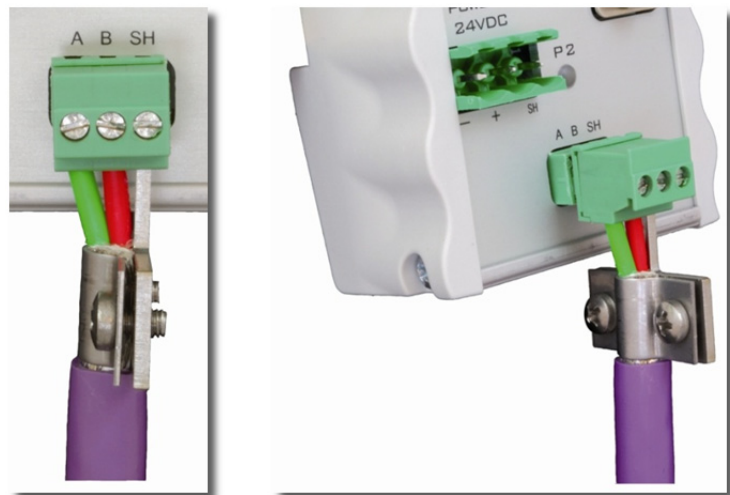


Fig. 4 Using the Ground Clip

Diagnostic LEDs

	OFF	Blinking	ON
P1	☹ Power is OFF or an internal failure. Check if P2 is on.	☹ Power supply not stable or an internal failure. Check if P2 is on.	☺ Power supply OK.
P2	☹ Power is OFF or an internal failure. Check if P1 is on.	☹ Power supply not stable or an internal failure. Check if P1 is on.	☺ Power supply OK.

Technical Data Adjustable Active DP Termination T1-Pepper	
Dimensions and weight	
Dimensions L x W x H (mm)	106 x 55 x 33 mm (without plugs) 106 x 55 x 55 mm (with plugs)
Weight	Approximately 125 g
Ambient conditions	
Operating temperature	-20 to +60° Celsius
Isolation class	IP 20 (DIN 40 050)
Protocol specifications	
Supported Protocols	DP-V0, DP- V1, DP-V2, FDL, MPI, FMS, PROFIsafe, PROFIdrive and any other FDL based protocol.
Transmission speed	9,6 kbps to 12 Mbps (including 45,45 kbps), depending on the cable quality.
PROFIBUS cable specifications	
Cable lengths	Depending on cable quality: 1200 m at 9,6 kbps to 93,75 kbps 1000 m at 187,5 kbps 400 m at 500 kbps 200 m at 1,5 Mbps 100 m at 3 Mbps to 12 Mbps
Wire diameter	< 2,5 mm ²
Wire type	Stranded or Solid core
Termination range (MIDDLE)	94 .. 940 Ohm (DC) 57 .. 1500 Ohm (AC)
Idle voltage range (PULL-UP)	0 .. 5 V
Download our software tool to calculate the correct settings for the rotary switches from www.procentec.com/downloads	
Power supply specifications	
Nominal supply voltage	19 to 28 VDC
Current consumption	65 mA at 24 VDC
Power dissipation	Max. 2 W
Redundancy	Yes (Power 1 <u>OR</u> Power 2)
Power LED	Power 1 <u>OR</u> Power 2
Reverse polarity protection	Yes
Wire diameter	< 2,5 mm ²

Table 1 - Impedance value

	Pull-Up 0	Pull-Up 1	Pull-Up 2	Pull-Up 3	Pull-Up 4	Pull-Up 5	Pull-Up 6	Pull-Up 7	Pull-Up 8	Pull-Up 9	Pull-Up A	Pull-Up B	Pull-Up C	Pull-Up D	Pull-Up E	Pull-Up F
Middle 0	OPEN	1500	1200	667	560	408	382	304	270	229	220	192	182	162	158	143
Middle 1	940	578	527	390	351	284	272	230	210	184	179	160	153	139	135	124
Middle 2	780	513	473	359	326	268	256	219	201	177	172	154	148	134	131	121
Middle 3	426	332	315	260	242	208	201	178	165	149	145	132	128	118	115	107
Middle 4	360	290	277	234	219	191	185	165	154	140	137	125	121	112	110	102
Middle 5	260	222	214	187	178	159	155	140	133	122	119	111	107	100	98	92
Middle 6	246	212	204	180	171	154	150	136	129	119	116	108	105	98	96	91
Middle 7	195	173	168	151	145	132	129	119	113	105	104	97	94	89	87	83
Middle 8	182	162	158	143	137	126	123	114	109	101	100	93	91	86	85	80
Middle 9	152	138	135	124	120	111	109	102	97	92	90	85	83	79	78	74
Middle A	148	134	131	121	117	108	106	99	95	90	88	83	82	77	76	73
Middle B	128	118	115	107	104	97	96	90	87	82	81	77	75	71	71	67
Middle C	121	112	110	102	99	93	92	87	84	79	78	74	73	69	69	66
Middle D	107	100	98	92	90	85	84	79	77	73	72	69	67	65	64	61
Middle E	105	98	96	90	88	83	82	78	75	72	71	68	66	64	63	60
Middle F	94	89	87	83	81	77	76	72	70	67	66	63	62	60	59	57

Remarks:

- Example - Standard PROFIBUS cable: Pull-Up 6 and Middle 6 (150 Ohm and 1.22 V)
- Termination without power: Pull-Up 0
- No termination: Pull-Up 0 and Middle 0
- Software can be downloaded from our website to assist with defining the proper rotary positions

Table 2 - Idle voltage

	Pull-Up 0	Pull-Up 1	Pull-Up 2	Pull-Up 3	Pull-Up 4	Pull-Up 5	Pull-Up 6	Pull-Up 7	Pull-Up 8	Pull-Up 9	Pull-Up A	Pull-Up B	Pull-Up C	Pull-Up D	Pull-Up E	Pull-Up F
Middle 0	OPEN	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Middle 1	0.00	1.19	1.41	2.07	2.28	2.68	2.76	3.03	3.18	3.36	3.40	3.55	3.60	3.72	3.74	3.83
Middle 2	0.00	1.03	1.23	1.85	2.05	2.44	2.53	2.81	2.95	3.15	3.19	3.35	3.41	3.53	3.56	3.66
Middle 3	0.00	0.62	0.75	1.21	1.38	1.72	1.79	2.06	2.21	2.41	2.46	2.63	2.70	2.84	2.87	2.99
Middle 4	0.00	0.54	0.65	1.06	1.22	1.53	1.60	1.86	2.00	2.20	2.25	2.42	2.49	2.63	2.66	2.79
Middle 5	0.00	0.40	0.49	0.82	0.94	1.21	1.27	1.50	1.63	1.81	1.86	2.02	2.08	2.22	2.26	2.38
Middle 6	0.00	0.38	0.47	0.78	0.90	1.16	1.22	1.44	1.57	1.75	1.79	1.95	2.02	2.16	2.19	2.31
Middle 7	0.00	0.31	0.38	0.64	0.74	0.97	1.02	1.21	1.33	1.49	1.53	1.68	1.74	1.88	1.91	2.03
Middle 8	0.00	0.29	0.35	0.60	0.70	0.91	0.96	1.15	1.26	1.42	1.46	1.61	1.67	1.80	1.83	1.94
Middle 9	0.00	0.24	0.30	0.51	0.60	0.79	0.83	1.00	1.10	1.25	1.29	1.42	1.48	1.60	1.63	1.74
Middle A	0.00	0.23	0.29	0.50	0.58	0.77	0.81	0.98	1.07	1.22	1.25	1.39	1.44	1.56	1.59	1.70
Middle B	0.00	0.20	0.25	0.44	0.51	0.68	0.72	0.87	0.96	1.09	1.12	1.25	1.30	1.41	1.44	1.54
Middle C	0.00	0.19	0.24	0.42	0.49	0.65	0.68	0.83	0.91	1.04	1.08	1.20	1.25	1.36	1.38	1.48
Middle D	0.00	0.17	0.21	0.37	0.44	0.58	0.62	0.75	0.83	0.95	0.98	1.09	1.14	1.24	1.26	1.36
Middle E	0.00	0.17	0.21	0.36	0.43	0.57	0.60	0.73	0.81	0.93	0.96	1.07	1.12	1.22	1.24	1.34
Middle F	0.00	0.15	0.19	0.33	0.39	0.52	0.55	0.67	0.74	0.85	0.88	0.98	1.03	1.12	1.15	1.24

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